

Development of Tri-Laminate Antiviral Surgical Gown for Liquid Barrier Protection.

Supervisor

Dr.G.Thilagavathi

Candidate

Mr.V.Parthasarathi

A foremost problem for healthcare workers is the transmission of pathogens and bacteria from their patients to themselves and the reverse contamination. Bacteria contaminated fabric in hospitals are known to be a major source of infection as any blood contamination could pose a risk of transmission of bacteria and virus. In recent times the market demand of healthcare textiles has increased incredibly and the scope of surgical gowns is enormous due to hygiene consciousness. Spun bond polypropylene, polyester and viscose nonwoven fabrics with basis weight of 25 grams per square were sourced. The nonwoven fabrics pore size was characterized to analyze their suitability. Titanium dioxide nano particles were synthesized using Titanium tetra chloride as a precursor. First tri-laminate antiviral surgical gown named as PP 1 was developed with titanium nano finished polypropylene as an outer layer, PTFE film as a middle layer and polyester nonwoven as an inner layer which were bonded together using a fusing machine at a temperature of 210° C with heated roller temperature of 240° C and roller pressure of 120 N/cm². The developed surgical gown pore size was analyzed with capillary porometry. The Polypropylene/PTFE/Viscose tri-laminate antiviral surgical gown named as PP 2 was also developed, combining positive attributes of the skin friendly viscose nonwoven as an inner layer with polypropylene and PTFE. In addition Polyester/PTFE/Viscose tri-laminate antiviral surgical gown named as PET 3 was developed by replacing polypropylene with polyester as an outer layer. The PET 3 gown has passed viral penetration analysis and has better moisture vapour permeability as compared to PP 1 and PP 2, though is lower in various mechanical properties. The developed tri-laminate surgical gown was tested and analyzed for the properties such as antibacterial, viral penetration analysis, tensile strength, tearing strength, spray impact penetration, hydrostatic resistance and moisture vapour transmission using standard testing procedures under standard atmospheric conditions. The effect of plasma enhanced fluoro carbon treatment on outer layer of surgical gown has been studied. The effect of plasma enhanced fluoro carbon treatment on outer layer of surgical gown has been studied. By considering the comfort characteristic requirements of tri- laminate surgical gown, the PET 3 gown has higher moisture vapour permeability and could be used for healthcare textiles application.